

ABSTRACT

A system and method are provided for manufacturing a coil structure for a magnetic head. Initially, an insulating layer is deposited with a photoresist layer deposited on the insulating layer. Moreover, a silicon dielectric layer is deposited on the photoresist layer as a hard mask. The silicon dielectric layer is then masked. A plurality of channels is subsequently formed in the silicon dielectric layer using reactive ion etching (i.e. CF_4/CHF_3). The silicon dielectric layer is then used as a hard mask to transfer the channel pattern in the photoresist layer using reactive ion etching with, for example, $\text{H}_2/\text{N}_2/\text{CH}_3\text{F}/\text{C}_2\text{H}_4$ reducing chemistry. To obtain an optimal channel profile with the desired high aspect ratio, channel formation includes a first segment defining a first angle and a second segment defining a second angle. Thereafter, a conductive seed layer is deposited in the channels and the channels are filled with a conductive material to define a coil structure. Chemical-mechanical polishing may then be used to planarize the conductive material.